Food and Agriculture Organization of the United Nations

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Know your water: establishing robust water accounting systems

TOWARD RAPID WATER ACCOUNTING

Qazvin Irrigation Network, Iran

STUDY AREA

WHERE IS THE SITE?

Qazvin irrigation network (QIN) is located in north of Iran in Qazvin province. The province with less than 1 percent of the country's area, provides 4 percent of agriculture production of the country. The study area (QIN) is 89 900 hectares that are mostly farm lands but include small villages.

FACTS AND FIGURES

Climate: Semiarid with hot and dry summers and cold winters (about 286 mm/yr precipitation).

Crops: Wheat, alfalfa, barley and fodder corn cover around 65 percent of the cultivated area of the network.

End of construction works of the network: 1991.
Area of the agricultural lands: 81 700 ha
Length of canals: 1 100 km
No of water delivery structures: 168.
Area of the artificial recharge basin: 135 ha
Planting/harvesting seasons: Sept/June for field crops, May/Oct for irrigated vegetables.

Water sources: Groundwater is extracted from the Qazvin aquifer and surface water is transferred from the Taleghan Dam.

ANNUAL WATER SUPPLIES

Benchmark allocation for transfer of surface water from Taleghan Dam until 2014 (106 m³)	278
Benchmark allocation from 2015 (106 m³) (But QIN can receive more if there is extra water in the dam)	150
Average annual volume of water transferred from Taleghan Dam (2009–2018) (106 m³)	219
Total water withdrawal from Qazvin aquifer (106 m³) based on survey in 2009	464

GROUNDWATER STATUS

High percentage of water demands of the Qazvin irrigation network is supplied from Qazvin plain aquifer. Some facts and figures about Qazvin aquifer are as follows:

- **No. of authorized agricultural wells in the network:** 569.
- **No. of unauthorized agricultural wells in the network:** 249.
- **Share of authorized wells metered:** 63 percent.
- **Groundwater level drawdown:** 27 m (last 20 years).
- **Volume of annual artificial recharge:** 0-49 x 106 m³.

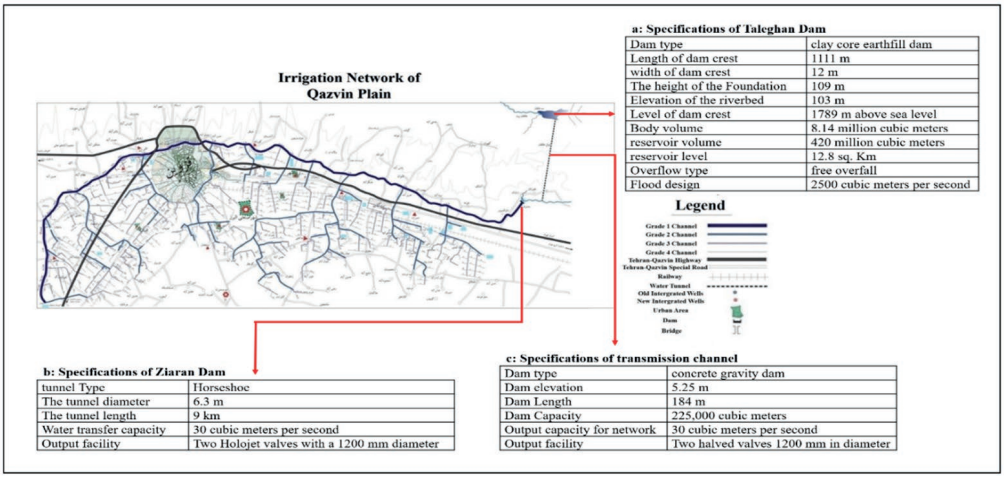
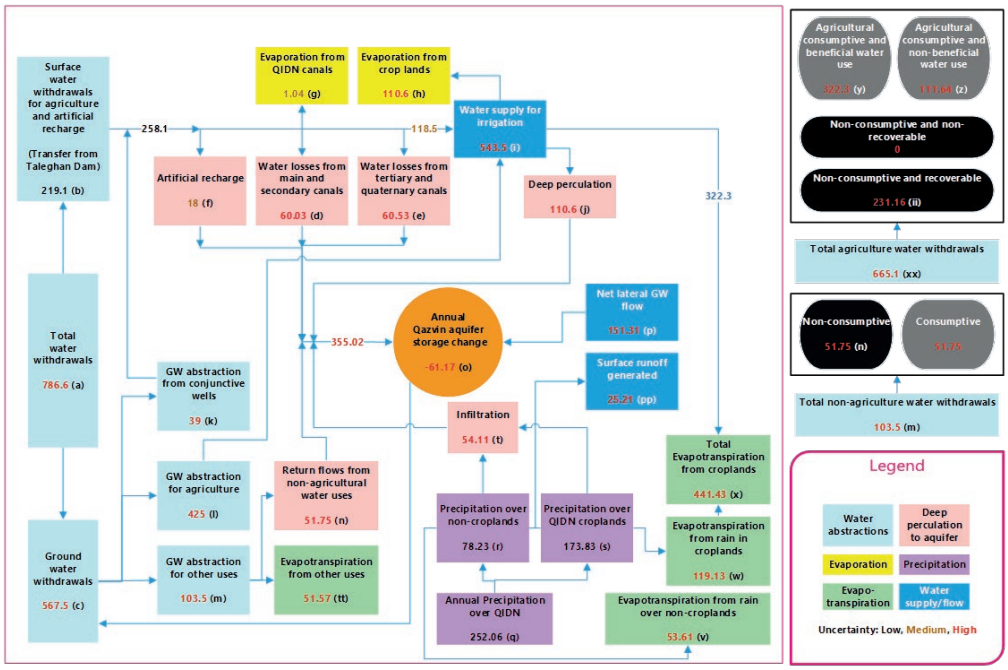


Figure 1. Components of Qazvin Development Project

HYDROLOGICAL CONCEPTUAL MODEL AND FRACTIONAL ANALYSIS OF THE STUDY AREA



CURRENT STATUS OF CANALS

Numbers are in million m³. Numbers in black (low), brown (medium), and red (high) show the degree of uncertainty. GW stands for groundwater. Qazvin aquifer information above is for the portion of the aquifer located within QIN boundary.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MAIN FINDINGS

1. Conveyance efficiency of the QIN canals is about 50 percent. It is assumed that the leak from the canal becomes groundwater recharge. Further study to better estimate the efficiency and the fate of the leak will be conducted in the next round of water accounting.
2. Estimated ET from the study area exceeds the sum of precipitation in QIN and water supply from the Taleghan Dam, and this leads to groundwater depletion. As the benchmark surface water allocation from the Taleghan Dam to QIN has been reduced since 2015, dependency on groundwater may increase unless water consumption is reduced.
3. Better estimation of ET is needed as comparison of ET calculated from irrigation efficiency with some assumptions (depicted in the hydrological conceptual model above) and ET obtained from FAO's WaPOR show a large difference.
4. The Ministry of Agriculture Jahad develops a cultivation plan, which estimates cultivated areas for each crop. Although this cultivation plan is used to determine water allocation at each diversion point, the actual cultivated area of each crop is very different from the cultivation plan.
5. Dissatisfaction among farmers on irrigation managers were reported. It could be due to the discrepancy between the cultivation plan and actual cultivated area. Also the increase of farmers' representatives for water delivery may make the communication between them difficult. Water auditing will help understand these social issues better.

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Food and Agriculture Organization of the United Nations
Regional Office for Near East and North Africa

RNE-WEPS-NENA@fao.org
www.fao.org/neareast

Sweden
Sverige